Johns Manville

InsulSpec™ – 3-Part Specification

Micro-Lok® *HP*

High Performance Fiber Glass Pipe Insulation

Chilled Water Pipe System Insulation

SECTION 15086 –PIPING INSULATION

PART 1.00 - GENERAL

1.01 SCOPE

A. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required for the correct installation of insulation on all chilled water pipe systems, fittings, valves, controls and all other necessary items connected into the system subject to condensation or loss of heat.

1.02 REFERENCES

A. ASTM C 547 Specification for Mineral Fiber Pipe Insulation

B. NFPA 90A Standard for the Installation of Air-Conditioning and Ventilating Systems

C. ASTM C 585 Practice for Inner and Outer Diameter of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)

D. ASTM C 795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel

E. ASTM C 1136 Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

F. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials

G. MIL-I-24244 Military Specification Insulation Material, with Special Corrosion, Chloride and Fluoride Requirements

H. NFPA 255 Method of Test of Surface Burning Characteristics of Building Materials

I. NRC 1.36 Nonmetallic Thermal Insulation for Austenitic Stainless Steel

J. NFPA 259 Standard Test Method for Potential Heat of Building Materials

1.03 SUBMITTALS

A. Product Data: Provide product description, list of materials and thickness for each service or equipment scheduled, locations, and manufacturer's installation instructions.

B. Shop Drawings: Submit list of insulation material and thickness to be used for each service. Include installation details for valves, fittings, pipe and all other items to be insulated.

C. Samples: Submit samples of each insulation system to be used.

1.04 QUALITY ASSURANCE

A. Insulation materials shall be manufactured at facilities certified and registered with an approved registrar to conform to the ISO 9001 Quality Standard.

B. All work shall conform to accepted industry and trade standards for commercial and industrial insulations, and shall conform with manufacturer's recommendations.

C. Installation shall be by licensed applicators.

D. Insulation materials that have become wet or contaminated shall not be installed.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials (insulation, coverings, tapes, cements, adhesives, coatings, etc.) to the jobsite in factory containers with manufacturer's label showing manufacturer, product name and product fire hazard information.

B. Protect the insulation from dirt, water, chemical attack and mechanical damage before, during and after installation.

C. Installed insulation which has not been weatherproofed and which is not protected by roof and walls shall be protected from precipitation by waterproof sheeting installed by the contractor. Wet or damaged insulation shall be removed and replaced by the contractor at no additional cost.

1.06 PROJECT/SITE CONDITIONS

A. Maintain jobsite temperature and conditions, before, during and after installation, as required by the manufacturers of insulation, adhesives and coatings.

PART 2.00 - PRODUCTS

2.01 MANUFACTURERS

A. Preformed fiber glass pipe insulation:
Johns Manville's Micro-Lok *HP* all-service (ASJ) vapor-retarder jacket with a self-sealing logitudinal closure lap (SSL) and butt strips or approved alternate.

B. PVC insulation jacketing: Johns Manville's Zeston® 2000 or approved alternate.

C. Fitting insulation insert: Johns Manville's Hi-Lo® Temp fiber glass insulation insert or approved alternate.

D. PVC tape: Johns Manville's Z-Tape or approved alternate.

2.02 MATERIALS

A. Micro-Lok *HP* preformed fiber glass pipe insulation, complying with ASTM C 547, Type I, and meeting the following requirements:
   1. Asbestos free.
   2. Furnished in standard lengths with ends cut square, conforming with the dimensional requirements of ASTM C 585.
   3. Thermal Conductivity ("k"): 0.23 Btu•in/(hr•ft²•°F) at 75°F mean temperature (0.033 W/m•°C at 24°C) per ASTM C 518.
   4. Installed Micro-Lok *HP* insulation at the thickness required to prevent condensation as indicated in project drawing as calculated by the NAIMA 3E Plus® program for most severe pipe operating conditions.
   5. Rated maximum service temperature: not less than 850°F (454°C).
   6. ASJ with SSL vapor retarder jacket, a white kraft paper, reinforced with a glass fiber yarn and bonded to aluminum foil, with self-sealing longitudinal closure laps and butt strips, complying with ASTM C 1136.
   7. Micro-Lok *HP* insulation with ASJ jacket and SSL shall have a flame spread rating not greater than 25 and a smoke developed rating not greater than 50 when tested as in accordance with ASTM E 84, UL 723 or NFPA 255.
   8. Material shall be limited-combustible as defined in NFPA 90A with a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) when tested in accordance with NFPA 259.
   9. When being used over stainless steel, product must comply with the requirements of ASTM C 795, MIL-I-24244 or NRC 1.36.

B. Fittings, valves, tees, etc. shall be insulated with Hi-Lo Temp fiber glass insulation inserts covered with Zeston 2000 insulated fitting covers.

C. Zeston 2000 PVC Field-Applied Jackets:
   1. [20 mil (0.5 mm) / 30 mil (0.8 mm) / 40 mil (1.0 mm)] stock thickness.
   2. UV resistant .
   3. Joints secured and sealed with Z-Tape.

D. Aluminum Field-Applied Jackets:
   1. 0.016" (0.41 mm) thick sheet.
   2. [Smooth / Embossed] finish.
   3. Longitudinal slip joints and 2" (51 mm) laps.
   4. Factory-applied protective liner.

E. Stainless Steel Field-Applied Jackets:
   1. Type 304 stainless steel.
   2. 0.10" (2.54 mm).
   3. [Smooth / Corrugated] finish.

F. Accessories:
   1. Stainless steel bands, ½" x 0.020" (13 mm x 0.5 mm), grade 304L.
   2. Stainless steel sheet metal screws, #6, 8 or 10, ⅜" (10 mm) long, hex or pan head.
   3. Aluminum bands, ½" x 0.020" (13 mm x 0.5 mm), alloy T-3003 H-14.
   4. Galvanized steel sheet metal screws, #6, 8 or 10, ⅜" (10 mm) long, hex or pan head.
   5. PVC tape.
   6. Vapor retarder mastic.

PART 3.00 - EXECUTION

3.01 EXAMINATION

A. Verify that testing of piping has been completed and that the piping is ready for installation of insulation.

B. Verify that all surfaces are clean, dry, and free from dirt, scale, moisture, oil and grease.

C. Verify that it is physically possible to install the fiber glass pipe insulation in accordance with project drawings, operation performance parameters and limitations of this specification.

3.02 INSTALLATION

A. All work activities shall be conducted in accordance with all applicable federal, state and local codes and laws. This shall include, but not be limited to, the Occupational Safety and Health Act.

B. All insulation shall be installed by a licensed applicator and applied in accordance with the manufacturer's recommendations.

C. All work shall conform with accepted industry and trade standards for commercial and industrial insulations.

D. General installation requirements for indoor piping in indirectly conditioned and concealed spaces:

Johns Manville

InsulSpec™ – 3-Part Specification

Micro-Lok® *HP*

High Performance Fiber Glass Pipe Insulation

1. Preformed fiber glass pipe insulation with ASJ and SSL jacket shall be applied to piping with all joints tightly fitted to eliminate voids.
2. Longitudinal jacket laps and butt strips shall be smoothly secured according to manufacturer's recommendations.
3. When adhered, the lap and butt strips must be pressurized by rubbing firmly with a plastic squeegee or the back of a knife blade to ensure positive closure.
4. In dual cycle systems, the installed insulation thickness shall be enough that the surface temperature shall be kept below 150°F (66°C).
5. All pipe insulation shall be continuous through wall and ceiling openings and sleeves, except where fire stop materials are required.
6. Insulation on all surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchor, etc., that are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. The butt end of every fourth pipe insulation section shall be sealed with vapor retarder mastic.
7. All surface finishes are to be extended to protect all surfaces, ends and raw edges of insulation, ends or raw edges of insulation terminations at equipment connections, or fittings shall be sealed with vapor retarder mastic.
8. Rigid insulation inserts shall be installed on pipe sizes 1½" (38 mm) or larger under outside hangers. The thickness of inserts shall be equal to the thickness of the adjoining insulation and shall be provided with vapor retarder seals.
9. Insulation inserts shall not be less than the following lengths:

Pipe Size		**Length**	
in.	mm	in.	mm
1½ – 2½	40 – 65	10	254
3 – 6	80 – 150	12	305
8 – 10	200 – 250	16	406
12 & up	300 & up	22	559

10. Galvanized metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and shall be of the length specified for the insulation hanger inserts less 4" (102 mm) to allow for vapor retarding butt joints on each side of the shields.
11. Specified adhesives, mastics and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.
12. When PVC jacketing is used, care shall be taken to ensure that the surface temperature of the fitting will be kept below 150°F (66°C) by the use of the proper thickness of insulation and by keeping the PVC cover away from contact with, or exposure to, sources of direct or radiant heat.

E. Indoor piping in indirectly conditioned and concealed spaces exposed to physical abuse or to high humidity such as mechanical rooms:
   1. Finish pipe insulation with Zeston 2000 PVC Cut & Curled™ jacketing.
   2. Fittings, valves and flanges shall be insulated to the same thermal performance (R-Value) as the pipe insulation with Hi-Lo Temp insulation inserts or fabricated fitting insulation and covered with Zeston 2000 PVC insulated fitting covers.
   3. All joints in the Zeston 2000 PVC Cut & Curled jacketing and Zeston fitting covers shall be sealed with Zeston PVC Z-Tape.

F. Outdoor piping systems:
   1. The insulation shall be finished with aluminum, stainless steel jacketing, or Zeston® 300 Series PVC jacketing.
   2. Aluminum or stainless steel jacketing shall be overlapped 2" to 3" (51 mm to 76 mm) and held in place with metal bands.
   3. Elbows and tees for metal-jacketed systems shall be finished with matching metal fitting covers. Other fittings in metal-jacketed systems shall be finished with conventional weather-resistant insulation materials with painted aluminum finish.
   4. Zeston 300 PVC jacketing shall be [30 mil (0.8 mm) / 40 mil (1.0 mm)] stock thickness. It shall be secured by overlapping and sealing all joints with Zeston Perma-Weld® solvent welding adhesive, per manufacturer's recommended installation procedures.

5. Fittings, valves and flanges shall be insulated to the same thermal performance (R-Value) as the pipe insulation with Hi-Lo Temp insulation inserts or fabricated fitting insulation and covered with Zeston 300 PVC insulated fitting covers. All joints shall be sealed using Zeston Perma-Weld solvent welding adhesive, per manufacturer's recommended installation procedures.

3.03 FIELD QUALITY CONTROL

A. Upon completion of installation of the insulation and before system start-up, visually inspect and verify that the insulation has been correctly installed.

B. Confirm that any damage to the vapor retarder jacket has been properly repaired.

Johns Manville

717 17th St.
Denver, CO 80202
(800) 654-3103
(800) 978-2318 FAX
specJM.com

North American Sales Offices, Insulation Systems

Eastern Region
P.O. Box 158
Defiance, OH 43512
(800) 334-2399
Fax: (419) 784-7866

Western Region & Canada
P.O. Box 5108
Denver, CO 80217
(800) 368-4431
Fax: (303) 978-4661

CI-239 3-08 (New)

Printed on recycled paper.